IN THE CLAIMS

1-9. (Canceled)

10. (Currently Amended) An optical delay line comprising:

a plurality of optical fiber differential delay lines, each comprising a long A optical fiber and a short B optical fiber; and

a plurality of phase actuated switchers connecting said plurality of optical fiber differential delay lines, wherein:

each of said plurality of phase actuated switchers is configured to switch an input signal to the long A optical fiber or the short B optical fiber of its respective optical fiber differential delay line; and wherein at least one of said phase actuated switchers includes:

a fiber coupler connected to at least one of said plurality of optical fiber differential delay lines; and

a spatial light modulator that reflects an input signal from said fiber coupler.

11. (Previously Presented) The optical delay line of claim 10 wherein for each of said plurality of optical fiber differential delay lines:

said long A optical fiber is connected to a first one and a second one of said plurality of phase actuated switchers; and

said short B optical fiber is connected to said first one and said second one of said plurality of phase actuated switchers.

12-13. (Canceled)

14. (Currently Amended) ~~The optical delay line of claim 10~~ An optical delay line comprising:

a plurality of optical fiber differential delay lines, each comprising a long A optical fiber and a short B optical fiber; and

a plurality of phase actuated switchers connecting said plurality of optical fiber differential delay lines, wherein:

each of said plurality of phase actuated switchers is configured to switch an input signal to the long A optical fiber or the short B optical fiber of its respective optical fiber differential delay line; and wherein at least one of said phase actuated switchers includes:

a fiber coupler connected to at least one of said plurality of optical fiber differential delay lines;

at least one switch fiber connected to said fiber coupler; and

a piezoelectric-stretcher attached to said switch fiber.

15. (Original) The optical delay line of claim 10 wherein at least one of said plurality of optical fiber differential delay lines comprises:

a short B optical fiber having a length L^k_B;

a long A optical fiber having a length L^k_A wherein said differential delay line delays an input optical signal by an amount of time proportional to $(L^k_A - L^k_B)$.

16. (Original) The optical delay line of claim 10 wherein at least one of said plurality of optical fiber differential delay lines comprises:

a short B optical fiber having a length L^k_B;

a long A optical fiber having a length L^k_A wherein:

said differential delay line delays an input optical signal by an amount of time $(t_A - t_B)$ proportional to $(L^k_A - L^k_B)$; and

$(t_A - t_B) = 2^k\tau$, for some integer value of $k \geq 0$, where τ is a time resolution of the optical delay line.

17. (Original) The optical delay line of claim 16 wherein:

said plurality of phase actuated switchers connect said plurality of differential delay lines in pairs between an input and an output of the optical delay line so that a differential delay Δt between an input and an output of the optical delay line is the sum of the differential delays of each of the plurality of differential delay lines; and

$$\Delta t = \tau \sum_{j=1}^{M} 2^{k_j}$$, where $\{k_1, \ldots, k_M\}$ is a set differential delay lines with an A optical fiber selected.

18. (Previously Presented) An optical communication system comprising:

a plurality of optical fiber differential delay lines; and

a plurality of phase actuated switchers connecting said plurality of optical fiber differential delay lines in pairs wherein at least one of said phase actuated switchers includes:

a fiber coupler connected to at least one of said plurality of optical fiber differential delay lines;

at least one switch fiber connected to said fiber coupler;

a collimator at an end of said switch fiber; and

a mirror of an electronically controlled spatial light modulator that reflects an input signal from said collimator back into said collimator; and wherein:

at least one of said plurality of optical fiber differential delay lines comprises:

a long A optical fiber wherein said long A optical fiber is connected to a first one and a second one of said plurality of phase actuated switchers; and

a short B optical fiber wherein said short B optical fiber is connected to said first one and said second one of said plurality of phase actuated switchers.

19. (Original) The system of claim 18 wherein at least one of said phase actuated switchers includes:

a fiber coupler connected to at least one of said plurality of optical fiber differential delay lines;

at least one switch fiber connected to said fiber coupler; and

an electronically controlled electro-optical modulator that adjusts the phase of an input signal in said switch fiber.

20. (Canceled)

21. (Previously Presented) The system of claim 18 wherein at least one of said phase actuated switchers includes:

a fiber coupler connected to at least one of said plurality of optical fiber differential delay lines;

at least one switch fiber connected to said fiber coupler;

a collimator at an end of said switch fiber;

a stationary mirror; and

an electronically controlled bi-refringent crystal disposed between said collimator and said stationary mirror.

22. (Previously Presented) An optical communication system comprising:

a plurality of optical fiber differential delay lines; and

a plurality of phase actuated switchers connecting said plurality of optical fiber differential delay lines in pairs wherein at least one of said phase actuated switchers includes:

a fiber coupler connected to at least one of said plurality of optical fiber differential delay lines;

at least one switch fiber connected to said fiber coupler and terminated with a mirror; and

an electronically controlled piezoelectric-stretcher attached to said switch fiber between said fiber coupler and said mirror; and wherein:

at least one of said plurality of optical fiber differential delay lines comprises:

a long A optical fiber wherein said long A optical fiber is connected to a first one and a second one of said plurality of phase actuated switchers; and

a short B optical fiber wherein said short B optical fiber is connected to said first one and said second one of said plurality of phase actuated switchers.

23. (Previously Presented) The system of claim 18 wherein said plurality of optical fiber differential delay lines includes N+1 differential delay lines numbered by k from 0 to N, wherein N is a number greater than or equal to zero, and for each specific value of k, the k-th differential delay line comprises:

a k-th short B optical fiber having a length L^{k}_{B};

a k-th long A optical fiber having a length L^k_A wherein:

said k-th differential delay line delays an input optical signal by an amount of time $(t^k_A - t^k_B)$ proportional to $(L^k_A - L^k_B)$;

$(t^k_A - t^k_B) = 2^k\tau$, where τ is a time resolution of the optical delay line;

said N+1 differential delay lines and said plurality of phase actuated switchers allows digitally controlling a differential delay Δt over the range from 0 to $(2^{N+1}-1)\tau$ with a time resolution of τ; and

$$\Delta t = \tau \sum_{j=1}^{M} 2^{k_j}$$

, where $\{k_1, \ldots, k_M\}$ is a set differential delay lines with an A optical fiber selected.

24. (Previously Presented) An optical system comprising:

a plurality of optical fiber differential delay lines; and

a plurality of phase actuated switchers connecting said plurality of optical fiber differential delay lines in pairs wherein:

said plurality of phase actuated switchers comprises a plurality of mirrors of a spatial light modulator;

said spatial light modulator provides equal adjustment of positions for all mirrors simultaneously to phase modulate an input optical signal;

said plurality of optical fiber differential delay lines includes N+1 differential delay lines numbered by k from 0 to N, wherein N is a number greater than or equal to zero, said plurality of phase actuated switchers includes N+2 phase actuated switchers numbered by k from 0 to N+1, and for each specific value of k, the k-th differential delay line comprises:

a k-th short B optical fiber having a length L^k_B and connected between a k-th phase actuated switcher and a (k+1)-th phase actuated switcher of said plurality of phase actuated switchers;

a k-th long A optical fiber having a length L^k_A and connected between said k-th phase actuated switcher and said (k+1)-th phase actuated switcher of said plurality of phase actuated switchers and wherein:

said k-th differential delay line delays said input optical signal by an amount of time (t^k_A - t^k_B) proportional to (L^k_A - L^k_B);

(t^k_A - t^k_B) = $2^k\tau$, where τ is a time resolution of the optical delay line;

said N+1 differential delay lines and said plurality of phase actuated switchers allows digitally controlling a differential delay Δt over the range from 0 to $\left(2^{N+1}-1\right)\tau$ with a time resolution of τ;

$$\Delta t = \tau \sum_{j=1}^{M} 2^{k_j}$$, where $\{k_1, \ldots, k_M\}$ is a set of said N+1 differential delay lines with an A optical fiber selected by one of said plurality of phase actuated switchers.

25-28. (Canceled)

29. (Previously Presented) An optical phase modulator comprising:

a plurality of optical fiber differential delay lines; and

a plurality of phase actuated switchers connecting said plurality of optical fiber differential delay lines in pairs, wherein:

each of said phase actuated switchers includes:

a fiber coupler connected to at least one of said plurality of optical fiber differential delay lines; and

a light phase adjustment device that includes a mirror and is connected to said fiber coupler;

at least one of said plurality of optical fiber differential delay lines comprises a long A optical fiber connected to a first one and a second one of said plurality of phase actuated switchers, and a short B optical fiber connected to said first one and said second one of said plurality of phase actuated switchers; and

each of said light phase adjustment devices is simultaneously controlled to equally adjust a phase of an input signal at all mirrors simultaneously so that said optical phase modulator modulates said phase of said input signal.

30-31. (Canceled)

32-37. (Canceled)

38. (Previously Presented) A method for providing a differential delay in an optical signal comprising the steps of:

switching an input signal, either into a long A optical fiber of a differential delay line or else into a short B optical fiber of said differential delay line, to have any delay in a pre-determined dynamic range with time resolution τ; and

phase modulating the input signal by simultaneously adjusting a phase of the input signal by an equal amount at a plurality of phase actuated switchers.

39. (Canceled)

40. (Original) The method of claim 38 wherein said switching step further includes:

switching the input signal among a plurality of differential delay lines so that the input signal is delayed by a sum of delays and said sum of delays includes a combination of long A optical fibers and short B optical fibers of said plurality of differential delay lines.

41. (Original) The method of claim 38 wherein said switching step further includes:

providing a first differential delay line with a minimum time delay τ;

providing at least one second differential delay line with a time delay that is a multiple of time delay τ; and

providing phase actuated switchers capable of switching the input signal among all possible combinations of long A optical fibers and short B optical fibers of said first and second differential delay lines so that a differential delay of the input signal may sum to any multiple of τ within a predetermined total range.

42. (Previously Presented) The method of claim 38 wherein said switching step further includes:

switching the input signal over a variable part of a delay line, wherein said variable part comprises a plurality of differential delay lines allowing digitally controlling a delay over the

range from 0 to $\left(2^{N+1}-1\right)\tau$ with a time resolution of τ, wherein N is a number greater than or equal to zero and N+1 is the number of said differential delay lines.

43. (Canceled)